

REMARKS

This response is being filed in supplement to that filed on July 13, 2009. It is being filed to correct a typographical error noted in Claim 86. The claim amendments and remarks, filed July 13, 2009, have been included in their entirety.

The Office Action dated February 11, 2009 was received and carefully reviewed.

By way of the current response, claims 1-58, 82-86, and 90-93 have been amended to further clarify the invention, and not for reasons of patentability. Claims 59-81 and 87-89 are hereby canceled without prejudice or disclaimer. Presently, new claims 94-100 have been added, but do not include new matter. Accordingly, claims 1-58, 82-86, and 90-100 are currently pending in the subject application.

In view of the above amendments and the following remarks, Applicant respectfully requests reconsideration and allowance of the application.

Drawing

In response to the Examiner's drawing objections a better quality copy of the drawings has been submitted herewith. Accordingly, Applicant respectfully requests the withdrawal of the objection.

Specification

As requested by the Examiner, titles have been added to the specification, as seen in the substitute specification submitted herewith. Accordingly, Applicant respectfully requests the withdrawal of the objection to the specification.

Claim Objections

Claims 9-52 have been amended thereby obviating the Examiner's objection. Further, claims 59-81 and 87-87 have been deleted, thereby rendering the Examiner's objection to these claims moot.

The term "optic-optic modulator" in claim 3 has been amended to "acoustic-optic modulator". The description refers to an acoustic-optic modulator on page 11, lines 19 to 20.

Where the Examiner has objected to the use of the term “channel spectrum”, it is assumed that he is actually referring to the term “channelled spectrum”. Applicant would like to submit that the term “channelled spectrum” is a term of art. In particular, the term “channelled spectrum” refers to the resultant spectrum of two beams having a delay with respect to one another which are superposed. In such circumstances the resultant spectrum exhibits bands or channels and the number of bands or channels depends upon the optical phase difference (OPD). It is well known in the art that such channelled resultant spectrums are known as “channelled spectrum(s)”.

Claim 55 has been amended such that the first reference to an object specifically states “using an object”.

Claim Rejections – Prior Art

Claims 1-8 and 53-59 stand rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by de Boer et al. (U.S. Pub. No. 2005/0018201 A1) (*de Boer*, hereinafter). Claim 93 stands rejected to under 35 U.S.C. § 103(a) as allegedly being unpatentable over *de Boer*. Applicant traverses these rejections for at least the reason set forth below.

Applicants assert that independent claims 1, 4, 6, 53, 54, 55, 57, and 93, and the claims dependent therefrom, are patentably distinguishable over *de Boer*, since *de Boer* fails to disclose, teach, or suggest each and every feature recited in the independent claims.

Independent claims 1, 4, 6, 53, 54, 55, 57, and 93 have been amended to state that the optical spectrum dispersing means receives the relatively displaced object beam and the relatively displaced reference on different portions of the optical spectrum dispersing means due to lateral displacement of the two relatively displaced beams caused by the displacing means.

The beams from the reference arm and the object arm are described as being “laterally displaced” on the dispersing means throughout the description, for example, on page 15, lines 19 to 20, and page 29, line 30, to page 30, line 8.

Independent claims 1, 4, 6, 53, 54, 55, 57, and 93 have also been amended to state that the optical spectrum dispersing means disperses the spectral content of the beams onto a reading

element such that the relatively displaced reference beam and the relatively displaced object beam are superposed on the reading element. These amendments are supported, in particular, by the final paragraph of page 30.

Applicant contends that *de Boer* is a type of apparatus similar to the conventional arrangements discussed in the opening portions of this patent application. However, the apparatus of *de Boer* differs considerably from that of the invention as recited in independent claims 1, 4, 6, 53, 54, 55, 57, and 93.

In *de Boer*, a beam from a source 202 is split by a splitter 204 into a beam for a reference arm 206 and a beam from a sample (i.e. object) arm 208 (see *de Boer*, e.g., paragraph [0081] and FIG. 3). The beams from the reference arm 206 the sample arm 208 are recombined by the splitter 204 and provided to a grating 212 (see *de Boer*, e.g., paragraph [0081] and FIG. 3). The grating 212 disperses the spectral content of the beams from the reference arm 206 the sample arm 208 onto a detector array 216 (see *de Boer*, e.g., paragraph [0081] and FIG. 3). The beams from the reference arm 206 the sample arm 208 in *de Boer* are thus superposed on the grating 212, which then disperses the superposed beams onto the detector array 216 (see *de Boer*, e.g., paragraph [0081] and FIG. 3).

As defined in the present independent claims, the “optical spectrum dispersing means” (which could, for example, be a grating) receives the beam from the reference arm and the beam from the object arm (the two “relatively displaced beams” in the present independent claims) on different portions of the optical spectrum dispersing means due to lateral displacement of the two relatively displaced beams caused by the displacing means. The “optical spectrum dispersing means” disperses these two laterally displaced beams so that they are superposed onto the reading element.

However, in *de Boer* there is **no such lateral displacing of the two beams**. The Examiner argues that that the transition stage 270 in the reference arm of *de Boer* is the “displacing means” of Claim 1 (see the Office Action, e.g., page 8). However, it is clear that the transition stage 270 is functionally equivalent to the stage 63 in Figure 3 of the present invention.

The transition stage 270 of *de Boer* does not laterally displace the beams such that the

grating 212 receives the beams from the object and reference arms on different portions of grating 212. It is very clear that the beams from the reference arm 206 and the object arm 208 are combined by the splitter 204 such that they are superposed onto the grating 210 in the *de Boer* reference.

Instead, in *de Boer* the only displacement by stage 270 is in the axial direction in the reference arm (i.e. along the beam direction of the reference arm). This axial displacement in *de Boer* creates the optical path difference in the interferometer. Thus, the applicant submits that the transition stage 270 helps create the optical path difference in the interferometer of *de Boer*.

In the present invention, the combination of the displacing means and the optical spectrum dispersing means is arranged to create an intrinsic optical delay between the wavetrains of the two relatively displaced object beam and the relatively displaced reference beam which can be used with the optical path difference in the interferometer to generate a channelled spectrum for the optical path difference in the interferometer on the reading element.

The “intrinsic optical delay” in present independent claims 1, 4, 6, 53, 54, 55, 57, and 93 results from the lateral displacement of the beams from the object and reference arms on different portions of the optical spectrum dispersing means. This “intrinsic optical delay” is combined with the “optical path difference” (relating to the path difference from the reference arm and the object arm”) to create a channelled spectrum for the optical path difference.

As explained in detail in the application as filed, producing such a channelled spectrum is useful for many sensing applications. The periodicity of the channelled spectrum is proportional to the optical path difference (OPD) in an interferometer).

The system of *de Boer* does not introduce an “intrinsic optical delay” (separate to the “optical path difference”) by lateral displacement of the beams from the reference and object arms. The system of *de Boer* merely permits adjustment of the length of the reference arm by means of a conventional transition stage 270.

Moreover, the disclosure of *de Boer* does not consider any other possible arrangement of such an apparatus. There is no consideration of the problem of interference between the object

beam and the reference beam. Consequently, there would be no motivation to even consider the existence of the problem of excess interference. Furthermore, the disclosure of de Boer provides no teachings that suggests providing the apparatus claimed in the independent claims of the present application.

The present invention provides an improved spectral interferometry apparatus in which the optical interference of the system is reduced compared to any previously known system, such as that disclosed in de Boer.

For at least the reasons stated above, *de Boer* neither anticipates nor renders obvious each and every feature recited in independent claims 1, 4, 6, 53, 54, 55, 57, and 93. Consequently, Applicant respectfully requests the withdrawal of the rejections, and the allowance of independent claims 1, 4, 6, 53, 54, 55, 57, and 93.

Furthermore, claims 2, 3, 5, 7, 8, 52, 56, 58, and 59 are allowable at least by virtue of their dependency from one of the independent claims, but also because they are distinguishable over the prior art. Accordingly, Applicants respectfully request the withdrawal of the rejection and the allowance of these claims.

New claims 94-100 are also distinguishable over the prior art. Accordingly, Applicants contend that these claims are in condition for immediate allowance.

In view of the foregoing, it is submitted that the present application is in condition for allowance and a notice to that effect is respectfully requested. If, however, the Examiner deems that any issue remains after considering this response, the Examiner is invited to contact the undersigned attorney to expedite the prosecution and engage in a joint effort to work out a mutually satisfactory solution.

Except for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§ 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 19-2380. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR**

EXTENSION OF TIME in accordance with 37 C.F.R. § 1.136(a)(3).

Respectfully submitted,

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